REMARKS

Claims 2-4, 6-10 and 15-20, and 23-42 remain in the application. Claims 1, 5, 11-14 and 21-22 were previously canceled without prejudice. Claim 37 is hereby amended. No new matter is being added.

35 U.S.C. § 112, Second Paragraph

Claim 37 was rejected under 35 U.S.C. § 112, second paragraph, as being indefinite in relation to the meaning of the term "renormalization." Claim 37 is hereby amended such that it now recites as follows.

> 37. The method as in any one of claims 25 or 26 further comprising renormalization by replacement of missing filter coefficients using a statistical function of remaining pixel values which are located at points contained within the arbitrary shaped domain.

The content of amended claim 37 is supported on page 27, lines 16-17 of the original application and also by original claim 37.

Applicants respectfully submit that claim 37, as amended, now clearly and definitively indicates what is being claimed. Hence, applicants respectfully submit that this rejection is now overcome.

35 U.S.C. § 103

Claims 2-4, 6-9, 15-17, 25-31, 33-34 and 36 stand rejected under 35 USC 103(a) as being unpatentable over Lee (US 6,539,060) in view of Biswas *et al.* ("Smoothing of Digital Images Using the Concept of Diffusion Process").

Claim 10 stands rejected under 35 USC 103(a) as being unpatentable over Lee and Biswas *et al.*, further in view of Lei *et al.* (US 6,356.665).

Claims 18, 21 and 35 stand rejected under 35 USC 103(a) as being unpatentable over Lee and Biswas *et al.*, further in view of Ostermann (US 5,646,689).

Claims 19-20 and 23-24 stand rejected under 35 USC 103(a) as being unpatentable over Lee and Biswas *et al.*, further in view of Etoh (US 5,859,932).

Claims 32 and 37-42 stand rejected under 35 USC 103(a) as being unpatentable over Lee and Biswas *et al.*, further in view of Avinash (US 6,757,442).

Each of the above prior art rejections relies on Lee. Applicants respectfully traverse each of these rejections for at least the following reasons.

A. The cited art does <u>not</u> disclose or suggest the limitation in the independent claims "Performing a combined <u>domain and pattern adaptive</u> transform on one of the collection of arbitrary shaped domains".

Previously-presented claim 2 recites as follows.

2. A method of processing all or a portion of a multi-dimensional signal with a domain composed of a collection of arbitrarily shaped domains via a multi-scale transform comprising the steps of:

   a. Obtaining a multi-dimensional digital image frame;

   b. Breaking the image frame into constituent arbitrary shaped domains, or given such a set, that cover all or a portion of the original multidimensional signal domain; and

   c. **Performing a combined domain and pattern adaptive transform on one or more of the collection of arbitrary shaped domains**, wherein a filter comprising a convolution operator is applied to process pixels near a boundary of the domain, and wherein filter coefficients for an interpolation filter are scaled by an inverse of a gradient value.

   (Emphases added.)

In relation to the above-emphasized claim limitation, the latest office action cites to the "IDCT" block in FIG. 1 of Lee and asserts that the apparatus 10 of FIG. 1 "uses patterns which is the same as edges from edge detection ". (Latest office action, page 5, lines 1-3.) However, there is no disclosure or suggestion in Lee that the IDCT block performs a combined domain and pattern adaptive transform. Rather, the IDCT block appears to simply perform a standard inverse discrete cosine transformation (inverse DCT).

Applicants respectfully submit that one of ordinary skill in the pertinent art would clearly understand that the inverse DCT operation of Lee is not an adaptive transform and is certainly not a domain and pattern adaptive transform. The specification clearly and explicitly defines a domain adaptive transform as follows. "A domain adaptive transform is a transform (multi-scale or otherwise), which

changes its rules of representation when it encounters the boundary of an arbitrarily shaped region." (Page 24, lines 20-23.) Furthermore, the specification clearly and explicitly defines a pattern adaptive transform as follows. "A pattern adaptive transform is a transform that adapts itself to the patterns inherently present in the data the transform being applied to." (Page 30, lines 13-15.)

In contrast, the inverse DCT operation of Lee does not change its rules based on the domains or patterns in the image frame data. Moreover, the inverse DCT operation of Lee does not even operate on image frame data, rather it operates on a matrix of DCT coefficients to generate decoded image data.

Applicants respectfully submit that one of ordinary skill in the pertinent art understands an inverse DCT operation applied to DCT coefficients as taught by Lee does not read on, and is not equivalent to, the claimed domain and pattern adaptive transform on one or more arbitrary shaped domains of an image frame.

The citations to Biswas *et al.* and the other references do not cure the above-discussed deficiency of Lee.

Therefore, applicants respectfully submit that the cited art does not teach or suggest the above-emphasized claim limitation. Therefore, applicants respectfully submit that claim 2 overcomes this rejection.

Dependent claims 6-10 and 15-20 and 23-42 depend from claim 2. Therefore, these claims also overcome their rejections for at least the same reasons as given in regard to claim 2.

Claim 3 recites, "Performing a combined domain and pattern adaptive transform on the signal". (Emphasis added.) Therefore, applicants respectfully submit that claim 3 overcomes its rejection for at least the reasons discussed above in relation to claim 2.

Claim 4 also recites, "Performing a combined domain and pattern adaptive transform". (Emphasis added.) Therefore, applicants respectfully submit that claim 4 overcomes its rejection for at least the reasons discussed above in relation to claim 2.

B. The cited art does not disclose or suggest the limitation in the independent claims which states "wherein a filter comprising a convolution operator is applied to process pixels near a boundary of the domain".

Previously-presented claim 2 recites as follows.

2. A method of processing all or a portion of a multi-dimensional signal with a domain composed of a collection of arbitrarily shaped domains via a multi-scale transform comprising the steps of:
    a. Obtaining a multi-dimensional digital image frame;
    b. Breaking the image frame into constituent arbitrary shaped domains, or given such a set, that cover all or a portion of the original multidimensional signal domain; and
    c. Performing a combined domain and pattern adaptive transform on one or more of the collection of arbitrary shaped domains, **wherein a filter comprising a convolution operator is applied to process pixels near a boundary of the domain**, and wherein filter coefficients for an interpolation filter are scaled by an inverse of a gradient value.

(Emphases added.)

In relation to the above-emphasized claim limitation, the latest office action cites to deblocking filter 110 of Lee. (Latest office action, page 5, lines 6-8.) However, there is no disclosure or suggestion in Lee that the deblocking filter 110 comprises a convolution operator. Moreover, rather than using a convolution operator, the deblocking filter 110 per Lee is described as using a "blocking semaphore," not a convolution operator. (See, Lee, col. 9, lines 13-23, for example.)

The citations to Biswas *et al.* and the other references do not cure the above-discussed deficiency of Lee.

Therefore, applicants respectfully submit that the cited art does not teach or suggest the above-emphasized claim limitation. Therefore, applicants respectfully submit that claim 2 overcomes this rejection.

Dependent claims 6-10 and 15-20 and 23-42 depend from claim 2. Therefore, these claims also overcome their rejections for at least the same reasons as given in regard to claim 2.

Claim 3 also recites, "wherein a filter comprising a convolution operator is applied to process pixels near a boundary of the domain". (Emphasis added.) Therefore, applicants respectfully submit that claim 3 overcomes its rejection for at least the reasons discussed above in relation to claim 2.

Claim 4 also recites, "wherein a filter comprising a convolution operator is applied to process pixels near a boundary of the domain". (Emphasis added.)

Therefore, applicants respectfully submit that claim 4 overcomes its rejection for at least the reasons discussed above in relation to claim 2.

Conclusion

For the above discussed reasons, applicants respectfully submit that each of the pending claims is clearly patentably distinguished over the cited art and is now in form for allowance.

Applicants respectfully note that the present application was filed back in December 2001, almost eight years ago. Compact prosecution and efficient resolution of this application is respectfully requested going forward with this application.

Favorable action is respectfully solicited. The Examiner is invited to call the undersigned for any questions.

Respectfully submitted,
Adityo Prakash, *et al.*

Dated: September 30, 2009

By: /James K. Okamoto, Reg. No. 40,110/

James K. Okamoto
Attorney For Applicant(s)
Reg. No. 40,110
OKAMOTO & BENEDICTO LLP
P.O. Box 641330
San Jose, California 95164
(408) 436-2110
(408) 436-2114 (FAX)